CHAPTER 4: Emergency response systems of individual IEA countries

The ability of the International Energy Agency (IEA) to co-ordinate a swift and effective international response to an oil supply disruption stems from the strategic efforts of member countries to maintain a state of preparedness at the national level. Energy security is more than just oil, as the role of natural gas continues to increase in the energy balances of IEA countries. The most recently completed cycle of Emergency Response Reviews (ERRs) reflected this change by assessing, for the first time, the member countries’ exposure to gas disruptions and their ability to respond to such crises. This chapter provides general profiles of the oil and natural gas infrastructure and emergency response mechanisms for 29 IEA member countries.

Each country profile is set out in the following sequence:

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Key natural gas data, 1990-2018
Total primary energy source (TPES) trend, 1973-2012

**Infrastructure map**

**Country overview**

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Oil demand
Imports/exports and import dependency
Oil company operations

*Oil supply infrastructure*
Refining
Ports and pipelines
Storage capacity

*Decision-making structure*

*Stocks*
Stockholding structure
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Location and availability
Monitoring and non-compliance
Stock drawdown and timeframe
Financing and fees

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Demand restraint
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Other

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Gas demand
Gas import dependency
Gas company operations

*Gas supply infrastructure*
Ports and pipelines
Storage

*Emergency policy*
Emergency response measures
### Italy

#### Key data

<table>
<thead>
<tr>
<th>Table 4.14.1 Key oil data</th>
<th>1990</th>
<th>2000</th>
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<th>2018*</th>
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<td>Demand (kb/d)</td>
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<td>1 853.8</td>
<td>1 780.6</td>
<td>1 544.2</td>
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<td>Motor gasoline</td>
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<td>438.3</td>
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<td>2 403.2</td>
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<td>45</td>
<td>39</td>
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* Forecast.

** TPES data for 2012 are estimates.

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<td>8 154</td>
<td>10 705</td>
<td>12 928</td>
<td>11 903</td>
<td>0</td>
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<tr>
<td>Net imports (mcm/y)</td>
<td>30 109</td>
<td>54 112</td>
<td>74 194</td>
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<td>69 468</td>
<td>66 310</td>
<td>68 953</td>
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<td>89.9</td>
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* 2012 data are estimates.

** Forecast.

Note: This section on the emergency response systems of individual member countries was written by the IEA. All countries provided valuable information and comments. All opinions, errors and omissions are solely the responsibility of the IEA.
Figure 4.14.1  Total primary energy source (TPES) trend, 1973-2012
Map 4.14.1 Oil infrastructure of Italy

This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.
Map 4.14.2  Gas infrastructure of Italy

This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.
Country overview

Italy has some indigenous production of oil and natural gas, but both oil and gas production will progressively decline in the coming years. In 2012, Italy’s total domestic oil production met only 7.7% of its domestic demand.

Italy is among Europe’s largest energy consumers, with its total primary energy supply (TPES) standing at around 159 million tonnes of oil-equivalent (Mtoe) in 2012. The supply mix remains dominated by oil and natural gas, which – although now declining – together have accounted for well over 70% of Italy’s TPES since 1973.

Italian oil demand is increasingly concentrated in the transportation sector. The progressive dieselisation of the vehicle fleet has significantly altered the demand structure. Diesel increased from 18% of total oil consumption in 1998 to 33% in 2012, while the share of gasoline declined from 23% to 16% during the same period.

The shift away from oil to natural gas, reducing oil’s share from over 76% in 1973 to 36% of the TPES in 2012, is mainly owing to the increased use of natural gas in power generation. Natural gas-fired electricity plants have replaced dual-fired electricity plants. The old oil-fired plants are used only to guarantee the fuel-switching mechanism during a possible gas system crisis. The shift away from dual-fired electricity plants to natural gas-fired electricity plants renders an emergency response system for natural gas indispensable. To address this need, an emergency plan is being implemented, together with the other EU member states. Italy fulfils its minimum oil stockholding requirements to the International Energy Agency (IEA) by placing stockholding obligations on industry. Companies are obliged to report to the Ministry of Economic Development on a daily basis, stating the exact location, product type and quantity of their stocks. A company’s non-compliance with its obligations can result in substantial financial penalties. In an emergency, oil operators can be granted permission to draw on stocks.

Italy has also established a natural gas emergency response policy which provides for mandatory security of supply measures such as minimum requirements for strategic and working gas storage. The level of strategic storage should be sufficient to replace the equivalent of 50% of peak imports at the main national entry point for 60 days. Italy’s maximum withdrawal capacity from storage could theoretically cover almost 70% of peak winter demand.

Oil

Market features and key issues

Domestic oil production

Domestic production of crude oil and other hydrocarbons has declined overall between 2005 and 2012 – from 124.5 thousand barrels per day (kb/d) in 2005 to 104.6 kb/d in 2012. However, there was a slight 1.2 kb/d increase in oil production from 2011 to 2012, with the level of production projected to continue to increase – reaching 135.6 kb/d by 2018. Italy’s total domestic oil production only met 7.7% of domestic demand in 2012 – a level that is expected to improve marginally, meeting 12% of domestic demand by 2018.

Oil demand

Italian oil demand is continuing to trend downwards, with a decline of more than 24% between 2005 and 2012. Forecasts indicate that this trend is set to continue, with
demand expected to decline by a further 17.7% by 2018. As natural gas and renewables have gradually replaced oil in the electricity generation and other sectors, the use of oil is becoming increasingly concentrated in the transportation sector.

**Figure 4.14.2** Oil consumption by product, 1998-2012

With regard to the transport sector, oil consumption increased significantly in the period from 1998 to 2012, but the progressive dieselisation of the vehicle fleet has significantly altered the demand structure. Diesel increased from 18% of total oil consumption in 1998 to 33% in 2012, while the share of gasoline declined from 23% to 16% during the same period.

**Figure 4.14.3** Oil demand by sector, 1973-2011
Imports/exports and import dependency

Italy is highly dependent on imports for its oil supply, importing 92.3% of the country’s requirements in 2012. The country’s import sources are widely diversified, however, with the Russian Federation, Libya and Saudi Arabia as the dominant sources of oil, each accounting for around one-fifth of all Italian crude oil imports. Azerbaijan and Kazakhstan together represent an additional quarter of Italian crude oil imports.

Oil company operations

The Italian oil market is fully open, with decisions regarding imports, exports, trade and pricing determined by the industry participants. The government intervenes only to protect competition and avoid abuse of dominant market positions. Companies proposing to set up refineries and oil product storage facilities require authorisation from the Ministry of Economic Development.

The former state oil company Eni has a dominant position in the Italian upstream oil and gas sector, although a number of private-sector Italian and foreign companies have also established a significant presence.

With regard to the downstream sector, distribution is principally undertaken by integrated oil companies. Eni has the largest retail market share in Italy, with a 31.2% market share in 2012 (up 0.7% from 2011). The company operates 4,780 service stations in Italy, under the Eni and Agip brands. In addition, independent pumps and supermarket pumps collectively account for around half of the country’s retail market.

Oil supply infrastructure

Refining

Italy plays an important role as Europe’s largest exporter of refined products, providing finished products (gasoline, diesel and residual fuels) to other countries.

There are 14 major refineries operating in Italy, 11 of which are located along the coast and are supplied by sea. The other four are situated in the Po Valley, in the north of Italy, and are supplied by pipelines from Genoa, Venice and Vado Ligure. In 2012, total refining output stood at around 1.7 mb/d – down from 2.1 mb/d in 2008.

The continuing decline in domestic demand for oil products (down 7 Mt in 2012) has led to a decrease in the refining volumes of both crude oil and semi-finished products to one of the lowest levels in the last two decades. The average utilisation rate of domestic Italian refineries declined to 78% in 2012.
Substantial investments have been carried out in recent years in order to adapt Italian refineries to changes in the oil market – a declining share of heavy fuel oil in the power sector and a growing share of cleaner fuels in the transport sector. As a net exporter, Italian refineries produce a surplus of gasoline, diesel oil and residual fuels, but have a deficit of jet and kerosene, liquefied petroleum gas (LPG) and ethane and naphtha.

**Ports and pipelines**

Italy has 16 crude oil tanker ports, four of which (at Taranto, Milazzo, Falconara [Ancona] and Augusta [Santa Panagia] can receive cargo ships of up to 300 000 dead weight tonnes. As most refineries are located along the Mediterranean coast, there are relatively few crude oil pipelines in Italy.

There are two major crude oil pipelines: the Central European Line (CEL) from Genoa (1 mb/d capacity), which supplies inland refineries in northern Italy and the Swiss refinery of Collombey, and the Trans-Alpine Pipeline (TAL) from Trieste, which supplies Germany, Austria and the Czech Republic. The trunk line, from Trieste to Ingolstadt (TAL-IG), has a capacity of 850 kb/d. However, there is no connection between the eastern and western halves of the northern pipeline network, reducing its potential flexibility during an oil supply disruption.

**Storage capacity**

Italy has 704 industrial and commercial storage depots across the country, with a total storage capacity of at least 26 million cubic metres (mcm). Of these, over 50% are located in four regions in the north of the country. Storage capacity is roughly split into one-third crude and two-thirds finished products.

**Decision-making structure**

Responsibilities for energy policy are shared between the central government and regional authorities. The Ministry of Economic Development is responsible for energy policy, and for maintaining an operational handbook on emergency procedures and measures for oil supply disruptions. The latest version of the handbook emphasises the following measures in the event of an oil supply disruption: voluntary demand restraint.
campaigns (public appeals to reduce energy consumption); reduced heating levels and hours; driving restrictions; stock drawdown; and fuel switching away from oil to other sources in electricity generation.

Within the Ministry of Economic Development, the Oil Office of the Security of Supply and Energy Infrastructure Directorate of the Department of Energy functions as the permanent body of the national emergency strategy organisation (NESO). Its role is to monitor the oil market, and in the case of an emergency, to prepare information, data and studies, and to ensure liaison with the IEA and industry. It is also responsible for monitoring industry’s compliance with minimum stockholding requirements.

In a disruption, the Ministry of Economic Development would convene the full NESO body, called the Conference of Services. This includes representatives from several relevant ministries: the Ministry of Foreign Affairs, the Ministry of the Interior and its Department for Civil Defence, the Ministry of Transport, the Ministry of Defence, the Ministry of Environment, the Ministry of Health and the Ministry for Communications. The Conference of Services also includes representatives from the oil industry and industry associations and recently from the Central Oil Stocks Entity (OCSIT). The Conference of Services, chaired by a representative of the Ministry of Economic Development, would meet within 24 hours and would decide the measures to be taken in a supply disruption.

Stocks

Stockholding structure
All stocks held in Italy are industry stocks, with oil industry operators subject to a compulsory stockholding obligation. Italian legislation\(^5\), in compliance with EU Council Directive 2009/119/EC of 14 September 2009, requires that total compulsory stocks for the country as a whole must correspond to not less than 90 days of average daily net imports or 61 days of average daily inland consumption, whichever of the two quantities is greater.

The stockholding obligation is distributed proportionally among the various oil companies in the market on the basis of product amounts released for inland consumption in the previous year. There are approximately 100 companies with stockholding obligations in Italy. Individual stockholding commitments of companies may be transferred from one to another through leasing or storage rental agreements.

From 2014, the OCSIT (established in 2013) will progressively assume responsibility for an increasing proportion of the country’s stockholding obligation from industry.

Crude or products
Italian law stipulates that 30% of compulsory stocks must consist of products from four key categories (gasoline, diesel, fuel oil and jet fuel). Obligated companies are then free to determine the makeup of the remainder of their obligated stock. Compulsory and commercial stocks can be, and often are, commingled.

Location and availability
For security of supply reasons, Italian law requires that at least 30% of compulsory stocks (the product component consisting of gasoline, diesel, fuel oil or jet fuel) be stored on Italian territory. However, the country has no maximum ceiling for the amount of stock that companies can hold in other EU member states to fulfil the remainder of their stockholding obligation.

\(^5\) Decreto legislativo, number: 249; Official Journal: Gazzetta Ufficiale della Repubblica Italiana, number: 22.
Decree 22/2001 sets out guidelines for intergovernmental agreements on stockholding with other EU member states, in order to facilitate the coverage of stock obligations for companies. Italy has bilateral agreements with Germany, Hungary, Malta, the Netherlands, Slovenia, Spain, Denmark and the United Kingdom. Most stocks held in other countries under bilateral agreements are in the form of tickets. As of April 2013, around 14.75 mb of compulsory stocks were held in other countries, accounting for around 15 days of net imports.

**Monitoring and non–compliance**

Companies are obliged to report to the Ministry of Economic Development the exact location, quality and quantity of stocks on a daily basis. In collaboration with the Revenue Guard Corps and the Customs Agency, the ministry monitors each company’s compliance with the decree obligations.

The standard sanction for breaching stock obligations is a fine of EUR 6.5 per day per tonne by which the company falls short of its prescribed minimum for that specific location.

**Stock drawdown and timeframe**

In an IEA collective action, the ministry has the authority to require industry to release stocks. The time required from a government decision to release stocks until the commencement of the physical delivery of those stocks is estimated to be less than 24 hours.

A NESO decision to use emergency reserves during a supply disruption would be announced in a ministerial decree that would authorise companies to reduce their mandatory stocks by a certain amount, and to make these stocks available to the market. This decree would include an indication of each company’s share of stock drawdown.

**Financing and fees**

No financial support is given to oil companies for holding stocks.

*Other measures*

**Demand restraint**

The Conference of Services (the full NESO body) has the legal authority to decide upon demand restraint measures, implementing them through its operational structures.

The specific measures considered include: appeals to the public for voluntary measures to limit consumption; a reduction in domestic heating; and possible driving restrictions. During a crisis, monitoring activities would be intensified, including increased frequency of reporting of stock levels and product deliveries to the market. Industry participants would also be required to submit forecasts of anticipated sales on a regional basis. The regional prefectures would become responsible for monitoring deliveries to vital sectors and assuring initial data verification of regional reporting. Regional shortages of oil products could be addressed through a redistribution of supplies, subject to approval by the Ministry of Economic Development.

The Italian government has indicated that a driving ban is the measure that would be prioritised if it resorted to demand restraint measures. Italy has significant experience in imposing odd/even licence plate schemes, mainly to reduce air pollution in metropolitan areas during the winter. On an average day of application, this measure can reduce the normal consumption of gasoline and diesel for transportation by 10% to 15%. As the use of oil for heating is diminishing over time, the scope for oil savings through demand restraint measures on domestic heating is declining.
Fuel switching

Around one-third of oil-fired electricity generation plants can switch to natural gas in the event of an emergency. The potential of this emergency response measure is rapidly declining because of the shrinking share of oil in thermoelectric plants.

Other

The scope for surge production of crude oil is very limited as active fields are operating at, or close to, their maximum capacity.

Gas

Market features and key issues

Gas production and reserves

Italy has indigenous production of natural gas. Around two-thirds of Italy’s gas reserves are located offshore. Whereas in 1973, domestic production accounted for almost 90% of Italy’s supply needs, Italy’s production has progressively declined over the last 40 years, from 15.4 billion cubic metres (bcm) in 1973 to 8.6 bcm in 2012 (around 11% of Italy’s supply needs).

Gas demand

Demand for natural gas in Italy has grown rapidly over the last decades, notably as part of a national programme to alleviate the country’s dependence on oil imports. Gas demand shot up significantly between 1973 and 2011, growing from just 17 bcm in 1973 to 78 bcm in 2011 (it peaked at just over 86 bcm in 2005). This growth is almost entirely attributable to the increase in demand for power generation, as indicated in the graph below.

Figure 4.14.6  Natural gas consumption by sector, 1973-2011
Power generation still accounts for over 33.5% of total natural gas demand in Italy, after a heavy fall in 2012 consumption (-11%). The residential sector is the biggest source of demand growth for natural gas, as it is the preferred choice for domestic uses in new buildings. In the industrial sector, gas consumption has remained relatively stable (although declining slowly), owing both to the high market share that gas had already attained and to the low rates of industrial growth in recent years.

Gas import dependency

Import dependency for natural gas is very high, standing at 88.5% in 2012. Italy’s import dependency is set to slowly increase to around 90% by 2018. The vast majority of imports were delivered by pipeline in 2012, with the remaining amount delivered as LNG cargoes. Two countries – Algeria (21.8 bcm) and Russia (19.0 bcm) – account for 60% of Italy’s imports, followed by Libya (9%), and Qatar (9%). The Netherlands and Norway are also significant sources of natural gas imports for Italy.

Since May 2000, it has been compulsory to include a flexibility margin of at least 10% in all natural gas import contracts. This flexibility allows for the possibility of importing additional gas during peak periods such as winter cold snaps. Almost half of Italy’s natural gas import activity is conducted on the basis of long-term take-or-pay contracts, with an overall duration exceeding 30 years. One-quarter of the import activity is carried out through contracts having a total duration of between 20 and 30 years. The remaining one-quarter of contracts involves durations of less than 20 years.

Gas supply infrastructure

Ports and pipelines

There are four natural gas pipelines (TransMed, Greenstream, TAG, TENP/Transitgas) and three LNG terminals for importing natural gas into Italy.

Two pipeline entry points (Tarvisio and Mazara del Vallo) account for almost 40% of Italy’s gas imports. Italy’s biggest entry point is the TAG pipeline interconnection through Tarvisio in the northeast of the country, which in 2012 delivered 23.8 bcm of natural gas (maximum capacity of 4.99 mcm/h), equivalent to 35.3% of total gas imports to Italy. The TransMed interconnection to Tunisia through Mazara del Vallo in Sicily is also significant, delivering 20.8 bcm (30.8% of total gas imports to Italy) in 2012 (maximum capacity of 4.40 mcm/h).
Italy also has two LNG regasification terminals in operation: at Panigaglia in Liguria; and at the North Adriatic Sea offshore terminal near Rovigo, which began operations in 2009. A third LNG terminal is under construction at Livorno in Tuscany.

**Storage**

Gas storage infrastructure plays an important part in the Italian gas market. Storage is filled in the low-demand summer months and emptied during the peak-demand winter months. Ten storage fields operate in Italy, totalling about 9 bcm of commercial working capacity. Given that peak winter demand in recent years has stood at around 450 mcm/d, Italy’s maximum withdrawal capacity can theoretically cover almost 70% of peak winter demand (assuming perfect interconnectivity).

The long authorisation process, which includes environmental impact assessment requirements, has become a barrier to the creation of new storage capacity. Access to storage facilities is based on regulated third-party access, and published tariffs are established by the regulatory authority in line with criteria established by the government. The tariffs include a commodity charge, a strategic storage fee, and charges for volume, injection and withdrawal capacity.

**Emergency policy**

Italy’s natural gas emergency response policy provides for mandatory security measures in the national gas system (e.g. dispatching rules) aimed at reducing price fluctuation, increasing security of supply, co-ordinating the storage system and reducing the vulnerability of the gas system.

Italy was severely affected by a disruption of gas supplies over the winter of 2005-06, and has since taken significant measures to better prepare for another such situation. The Ministry of Economic Development updated its legislation regarding specific emergency procedures in 2013, with the adoption of the emergency plan as provided for by European regulation.

The update establishes the roles of the players involved, the system monitoring procedures and the measures to be taken by the ministry in the case of a crisis. A specific “technical emergency committee for the gas system” within the ministry was designed to adopt the most appropriate measures available. The emergency procedures list includes a series of measures for increasing gas imports and reducing gas consumption.

**Emergency response measures**

Each year, minimum natural gas storage volumes are set by a Ministry of Economic Development notice. Storage levels are expected to be sufficient to cover the equivalent of a 50% disruption of peak capacity at the main national entry point for a period of 60 days, and are determined on the basis of imports through the system’s major entry points. All natural gas imports from outside the European Union are included in this calculation.

Italy’s strategic stocks, located in the north of the country, stood at around 4.6 bcm ahead of the 2012-13 winter. Ownership of the natural gas stocks resides with the storage companies.

During the gas crisis in the winter of 2011-12, the Italian government decided, among other measures, to curtail demand from industrial customers directly connected to the transmission network. This affected 403 users and led to savings of 15.6 mcm/d from 6 to 13 February. Other demand restraint measures also affected 260 remotely controlled customers and led to further savings of 9 mcm/d from 7 to 9 February. Stock was also released from the strategic natural gas reserves to help alleviate the gas shortage.
A decree passed in April 2013 by the Ministry of Economic Development introduced new procedures (an emergency plan) for coping with supply crises involving the whole gas system. Furthermore, in order to diversify strategies, a mechanism of fuel switching for power generation is ready to be implemented. Such a measure was also used in 2012, but the updated procedures will work in a more flexible and cost-effective way, as provided for by a new ministerial decree passed in September of this year.

Fuel switching by power generators during the gas crisis in the winter of 2011-12 guaranteed savings in gas volume equal to 18 mcm/d. The amount of electricity previously generated from gas-fired power plants was instead produced by plants fuelled with combustible oil. Although successful in terms of natural gas savings, these measures were very expensive in environmental terms because the oil-fired plants are old and highly polluting, and in terms of direct cost because of high maintenance and fuel storage replenishment costs.

Options for fuel switching outside the transformation sector are limited, however, as only 0.5% of the industrial load can operate on fuels other than gas. Furthermore, large industrial facilities are not legally required to have alternative fuel available.